

David H. Gelfand - Page 1

**CURRICULUM VITAE****David H. Gelfand****Personal Statistics**

Date of Birth: June 9, 1944  
 Place of Birth: New York, New York

**Education**

1970 Ph.D. Biology, University of California, San Diego, La Jolla, California  
 1966 A.B. Biology, Brandeis University, Waltham, Massachusetts

**Research and Professional Experience**

12/91 - Present Director, Program in Core Research  
 12/XX - Present Vice President, Discovery Research  
 Roche Molecular Systems, Inc.  
 1145 Atlantic Avenue  
 Alameda, CA 94501-1145

11/88 - 12/91 Director, Core Technology, PCR Division, Cetus Corporation

3/81 - 12/91 Vice President, Scientific Affairs, Cetus Corporation

1/79 - 3/81 Vice President and Director of Recombinant Molecular Research, Senior Scientist,  
 Cetus Corporation

12/76 - 10/79 Director, Recombinant Molecular Research  
 Cetus Corporation

8/76 - 1/77 Assistant Research Biochemist, University of California at San Francisco  
 San Francisco, CA

Sponsor: William J. Rutter, Professor

Project: Isolation, characterization and expression of eucaryotic DNA sequences in bacterial cells.

1/72 - 8/76 Assistant Research Biochemist and Laboratory Manager, University of California at San Francisco, San Francisco, California

Sponsor: Gordon M. Tomkins, Professor (deceased July 1975)

Project: Effect of oncogenic viral transformation on the regulation of gene expression in cultured mammalian cells.

Isolation and characterization of mutants defective in tyrosine aminotransferase activity.

Construction of hybrid DNA molecules and genetic transformation.

7/70 - 1/72 Research Associate in Biology, University of California at San Diego, La Jolla, CA

Sponsor: Masaki Hayashi, Associate Professor

Project: DNA-dependent RNA-directed protein synthesis *in vitro*: temporal control of transcription and translation.

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5/70 - 7/70 NIH postdoctoral trainee in Molecular Genetics, University of California at San Diego, La Jolla, California

Sponsor: Masaki Hayashi, Associate Professor

Project: Same as above.

10/66 - 5/70 NIH predoctoral trainee in Molecular Genetics, University of California at San Diego, La Jolla, California

Sponsor: Masaki Hayashi, Associate Professor

Project: Viral DNA-dependent protein synthesis

7/66 - 10/66 Research Associate in Biology, University of California at San Diego, La Jolla, CA

Sponsor: Stanley Mills, Professor

Project: Passive immune kill in HeLA cells *in vitro*.

6/65 - 9/65 Research Assistant in Biochemistry, Brandeis University, Waltham, Massachusetts

Sponsor: Gordon Sato, Associate Professor

Project: Mechanism of steroid production and secretion in mouse tumor cells *in vitro*.

6/62 - 9/62 Research Assistant, School of Medicine, University of Michigan, Ann Arbor, Michigan

Sponsor: Raymond H. Kahn, Professor

Project: Effect of *Tubercule bacilli* in chick embryonic lung tissue *in vitro*.

6/61 - 9/61 Research Assistant, Department of Biology, New York University, New York, New York

Sponsor: M. J. Kopac, Professor

Project: Establishment of primary cell lines of amphibian liver *in vitro*.

## Awards and Honors

New York State S.E. Regional Science Fair, First Prize winner, Senior Division Biology and Grand Prize Winner (1962).

New York State Science Fair Finalist Sixth Prize (1962).

Awarded New York State four-year full-tuition scholarship (award not accepted).

Recipient, May 1990. IPO "Distinguished Inventor Award," Senate Office Building.

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#### Memberships

American Association for the Advancement of Science

American Society of Biochemistry and Molecular Biology

American Society of Microbiology

Genetics Society of America

National Science Foundation Scientific Advisory Council (1981-1984)

Department Visiting Committee, Department of Microbiology, University of Texas, Austin (1988- )

#### Publications

1. Gelfand, D.H., and Hayashi, M. (1969). Electrophoretic characterization of  $\Phi$ X174-specific proteins. *J. Mol. Biol.*, **44**:501-516.
2. Gelfand, D.H., and Hayashi, M. (1969). DNA-dependent RNA-directed protein synthesis *in vitro*, II: Synthesis of a  $\Phi$ X174 coat protein component. *Proc. Natl. Acad. Sci. USA*, **63**:135-137.
3. Bryan, R.N., Gelfand, D.H., and Hayashi, M. (1969). Initiation of SV40 DNA-directed protein synthesis with N-formylmethionine *in vitro*. *Nature*, **224**:1019-1021.
4. Gelfand, D.H., and Hayashi, M. (1970). DNA-dependent RNA-directed protein synthesis *in vitro*, IV: Peptide analysis of an *in vitro* and *in vivo*  $\Phi$ X174 structural protein. *Proc. Natl. Acad. Sci. USA*, **67**:13-17.
5. Jeng, Y., Gelfand, D.H., Hayashi, M., Schleser, R., and Tessman, E.S. (1970). The eight genes of bacteriophages  $\Phi$ X174 and S13 and comparison of the phage-specific proteins. *J. Mol. Biol.*, **49**:521-526.
6. Gelfand, D.H. (1970). Viral DNA-Dependent Protein Synthesis. Ph.D. dissertation.
7. Gelfand, D.H., and Hayashi, M. (1970). *In vitro* synthesis of a DNA-dependent RNA polymerase coded on Coliphage T7 genome. *Nature*, **228**:1162-1165.
8. Rousseau, G.G., Higgins, S.J., Baxter, J.D., Gelfand, D.H., and Tomkins, G.M. (1975). Binding of glucocorticoid receptors to DNA. *J. Biol. Chem.*, **250**:6015-6021.
9. Polisky, B., Bishop, R.J., and Gelfand, D.H. (1976). A plasmid cloning vehicle allowing regulated expression of eukaryotic DNA in bacteria. *Proc. Natl. Acad. Sci. USA*, **73**:3900-3904.
10. Ivarie, R.D., Gelfand, D.H., Jones, P.P., O'Farrell, P.Z., Polisky, B.H., Steinberg, R.A., and O'Farrell, P.H. (1977). Biological Applications of Two-Dimensional Gel Electrophoresis. In: *Electrofocusing and Isotachopheresis* (B.J. Radola and D. Graesslin, eds.), Walter deGruyter, Berlin, N.Y., pp. 369-384.
11. Gelfand, D.H., and Steinberg, R.A. (1977). Mutants of *Escherichia coli* deficient in the aspartate and aromatic amino acid aminotransferases. *J. Bact.*, **130**:429-440.
12. Gelfand, D.H., and Rudo, N. (1977). Mapping of the aspartate and aromatic amino acid aminotransferase genes *tryB* and *aspC*. *J. Bact.*, **130**:441-444.

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13. Bell, G.I., Degennaro, L.J., Gelfand, D.H., Bishop, R.J., Valenzuela, P., and Rutter, W.J. (1977). Ribosomal RNA genes of *Saccharomyces cerevisiae*, I: Physical map of the repeating unit and location of the regions coding for 5S, 5.8S, 18S and 25S ribosomal RNAs. *J. Biol. Chem.*, 252:8118-8125.
14. O'Farrell, P.H., Polisky, B. and Gelfand, D.H. (1978). Regulated expression by read-through translation from a plasmid encoded  $\beta$ -galactosidase. *J. Bact.*, 134:645-654.
15. Gelfand, D.H., Shepard, H.M., O'Farrell, P.H., and Polisky, B. (1978). Isolation and characterization of a ColE1-derived plasmid copy-number mutant. *Proc. Natl. Acad. Sci. USA*, 75:5869-5873.
16. Shepard, H.M., Gelfand, D.H., and Polisky, B. (1979). Analysis of a recessive plasmid copy number mutant: Evidence for negative control of ColE1 replication. *Cell*, 18:267-275.
17. Polisky, B., Gelfand, D.H., and Shepard, H.M. (1980). ColE1 plasmid replication control. In: *Plasmids and Transposons*, (C. Stutter and K.R. Rozee, eds.), Academic Press, New York, N.Y., pp. 313-323.
18. Cape, R.E., Gelfand, D.H., Innis, M.A., and Neidleman, S.L. (1982). An introduction to the present state and future role of genetic manipulation in the development of overproducing microorganisms. In: *Overproduction of Microbial Products*, (V. Krumphanzl, B. Sikyta and Z. Vanek, eds.), Academic Press, New York, N.Y., pp. 327-343.
19. Shoemaker, S., Schweickart, V., Ladner, M., Gelfand, D.H., Kwok, S., Myambo, K., and Innis, M. (1983). Molecular cloning of Exo-Cellobiohydrolase I derived from *Trichoderma reesei* strain L27. *Bio/Technology*, 1:691-696.
20. Innis, M.A., Holland, M.J., McCabe, P.C., Cole, G.E., Wittman, V.P., Tal, R., Watt, K.W.K., Gelfand, D.H., Holland, J.P., and Meade, J.H. (1985). Expression, glycosylation, and secretion of an aspergillus glucoamylase by *Saccharomyces cerevisiae*. *Science*, 228:21-26.
21. Greenfield, L., Dovey, H.F., Lawyer, F.C., and Gelfand, D.H. (1986). High-level expression of Diphtheria Toxin Peptides in *Escherichia coli*. *Bio/Technology*, 4:1006-1011.
22. Meade, J.M., White, T.J., Shoemaker, S.P., Gelfand, D.H., Chang, S., and Innis, M.A. (1987). Molecular cloning of Carbohydrases for the food industry. In: *Impact of Biotechnology on Food Production and Processing*. (D. Knorr, ed.) Marcel Dekker, New York, N.Y., pp. 393-411.
23. Van Arsdell, J.N., Kwok, S., Schweickart, V.L., Ladner, M.B., Gelfand, D.H., and Innis, M.A. (1987). Cloning, characterization, and expression in *Saccharomyces cerevisiae* of Endoglucanase I from *Trichoderma reesei*. *Bio/Technology*, 5:60-64.
24. Innis, M.A., McCabe, P.C., Cole, G.E., Wittman, V.P., Tal, R., Gelfand, D.H., Holland, M.J., Ben-Bassat, A., McRae, J., Inlow, D., and Meade, J.H. (1987). Expression of Glucoamylase in Yeast for Fermentation of Liquified Starch. In: *Biochemistry & Molecular Biology of Industrial Yeasts*. (G. Stewart, I. Russell, R. Klein, and R. Hiebsch, eds.), C.R.C. Press, Boca Raton, Florida.
25. Erlich, H.A., Gelfand, D.H., and Saiki, R.K. (1988). Specific DNA Amplification. *Nature*, 331:461-462.
26. Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R., Horn, G.T., Mullis, K.B., and Erlich, H.A. (1988). Primer-Directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase. *Science*, 239:487-491.
27. Innis, M.A., Myambo, K.B., Gelfand, D.H., and Brow, M.A.D. (1988). DNA Sequencing with *Thermus aquaticus* DNA Polymerase, and Direct Sequencing of PCR-amplified DNA. *Proc. Natl. Acad. Sci. USA*, 85:9436-9440.
28. Scharf, S.J. and Gelfand, D.H. (1988). Taq DNA Polymerase. In: *Current Protocols in Molecular Biology*. (F. Ausubel, et. al., eds.), Greene Publishing and J. Wiley & Sons, New York, N.Y.

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29. Lawyer, F.C., Stoffel, S., Saiki, R.K., Myambo, K., Drummond, R., and Gelfand, D.H. (1989). Isolation, Characterization, and Expression in *Escherichia coli* of the DNA Polymerase Gene from *Thermus aquaticus*. *J. Biol. Chem.* 266:6427-6437.
30. Gelfand, D.H. (1989). *Taq* DNA Polymerase. In: *PCR Technology: Principles and Applications for DNA Amplification*. (Erich, H.A., ed.), Stockton Press, New York, N.Y., pp. 17-22.
31. Innis, M.A., Gelfand, D.H., Sninsky, J.J., and White, T.J., eds. (1990). *PCR Protocols: A Guide to Methods and Applications*. Academic Press, San Diego, CA.
32. Innis, M.A. and Gelfand, D.H. (1990). Optimization of PCRs. In: *PCR Protocols: A Guide to Methods and Applications*. *ibid.* pp. 3-12.
33. Gelfand, D.H. and White, T.J. (1990). Thermostable DNA Polymerases. In: *PCR Protocols: A Guide to Methods and Applications*. *ibid.* pp. 129-141.
34. Wong, H.C., Fear, A.L., Calhoun, R.D., Eichinger, G.H., Mayer, R., Amikam, D., Benziman, M., Gelfand, D.H., Meade, J.H., Emerick, A.W., Bruner, R., Ben-Bassat, A., and Tal, R. (1990). Genetic Organization of the Cellulose Synthase Operon in *Acetobacter xylinum*. *Proc. Natl. Acad. Sci. USA*, 87:8130-8134.
35. Erlich, H.A., Gelfand, D.H., and Sninsky, J.J. (1991). Recent Advances in the Polymerase Chain Reaction. *Science* 252:1643-1651.
36. Myers, T.W. and Gelfand, D.H. (1991). Reverse Transcription and DNA Amplification by a *Thermus Thermophilus* DNA Polymerase. *Biochemistry* 30:7661-7666.
37. Holland, P.M., Abramson, R.D., Watson, R., and Gelfand, D.H. (1991). Detection of Specific Polymerase Chain Reaction Product by Utilizing the 5'→3' Exonuclease Activity of *Thermus aquaticus* DNA Polymerase. *Proc. Natl. Acad. Sci. USA* 88:7276-7280.
38. Barany, F. and Gelfand, D.H. (1991). Cloning, Overexpression and Nucleotide Sequence of a Thermostable DNA Ligase-Encoding Gene. *Gene* 109:1-11.
39. Lawyer, F.C., Stoffel, S., Saiki, R.K., Chang, S.-Y., Landre, P.A., Abramson, R.D., and Gelfand, D.H. (1993). High-level Expression, Purification, and Enzymatic Characterization of Full-length *Thermus aquaticus* DNA Polymerase and a Truncated Form Deficient in 5' to 3' Exonuclease Activity. *PCR Methods and Applications* 2:275-287.
40. Wetmur, J.G., Wong, D.M., Ortiz, B., Tong, J., Reichert, P. and Gelfand, D.H. (1994). Cloning, Sequencing, and Expression of RecA Proteins from Three Distantly Related Thermophilic Eubacteria. *J. Biol. Chem.* 269:25928-25935.
41. Innis, M.A., Gelfand, D.H., and Sninsky, J.J., eds. (1995). *PCR Strategies*, Academic Press, San Diego, CA.
42. Landre, P.A., Gelfand, D.H., and Watson, R.M. (1995). The Use of Cosolvents to Enhance Amplification by the Polymerase Chain Reaction. In: *PCR Strategies*. *ibid.* pp 3-16.
43. Auer, T., Sninsky, J.J., Gelfand, D.H., and Myers, T.W. (1996). Selective Amplification of RNA Utilizing the Nucleotide Analog dITP and *Thermus thermophilus* DNA Polymerase. *Nuc Acids Res.* 24:5021-5026.
44. Innis, M.A., Gelfand, D.H., and Sninsky, J.J., eds. (1999). *PCR Applications: Protocols for Functional Genomics*, Academic Press, San Diego, CA.
45. Innis, M.A., and Gelfand, D.H. (1999). Optimization of PCR: Conversations between Michael and David. In *PCR Applications: Protocols for Functional Genomics*. *ibid.* pp 3-22.
46. Kang, J.J., Watson, R.M., Fisher, M.F., Higuchi, R., Gelfand, D.H., and Holland, M.J. (2000). Transcript quantitation in total yeast cellular RNA using Kinetic PCR. *Nucleic Acids Res.*, 28, c2.

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47. Sauer, S., Gelfand, D.H., Boussicault, F., Bauer, K., Reichert, F., and Gut, I.G. (2002). Facile Method for Automated Genotyping of Single Nucleotide Polymorphisms by Mass Spectrometry. *Nucleic Acids Res.* 30: e22.
48. Smith E.S., Li A.K., Wang, A.M., Gelfand, D.H., Myers, T.M. (2003). Amplification of RNA: High-Temperature Reverse Transcription and DNA Amplification with a Magnesium-Activated Thermostable DNA Polymerase. In *PCR Primer: A Laboratory Manual*, 2nd Edition, Dieffenbach C.W. and Dveksler G.S., Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York, pp. 211-219.
49. Kalman, L.V., and Gelfand, D.H. Mutants of *Thermus aquaticus* DNA Polymerase with Altered Nucleotide Discrimination Properties. *submitted*.
50. Abramson, R.D., Stoffel, S., and Gelfand, D.H. Extension Rate and Processivity of *Thermus aquaticus* DNA Polymerase. *Submitted*

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## Issued U.S. Patents

1. Gelfand, D.H. "Stable High Copy Number Plasmids." U.S. Patent No. 4,631,257 assigned to Cetus Corp. 12/23/86.
2. Gelfand, D.H., Chang, S., and Wong, H.C. "Polypeptide Expression Using a Portable Temperature Sensitive Control Cassette with a Positive Retroregulatory Element." U.S. Patent No. 4,666,848 assigned to Cetus Corp. 5/19/87.
3. Gelfand, D.H. and Lawyer, F.C. "A Portable Temperature-Sensitive Control Cassette." U.S. Patent No. 4,711,845 assigned to Cetus Corp. 12/8/87.
4. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Universal Dominant Selectable Marker Cassette." U.S. Patent No. 4,784,949 assigned to Cetus Corp. 11/15/88.
5. Gelfand, D.H., Greenfield, L.I., and Lawyer, F.C. "Recombinant Diphtheria Toxin Fragments." U.S. Patent No. 4,830,962 assigned to Cetus Corp. 5/16/89.
6. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "SV40 Early and RSV Promoters Useful in *Saccharomyces* Expression." U.S. Patent No. 4,870,013 assigned to Cetus Corp. 9/26/89.
7. Gelfand, D.H. and Stoffel, S. "Purified Thermostable Enzyme." U.S. Patent No. 4,889,818 assigned to Hoffmann-La Roche, Inc. 12/26/89.
8. Mullis, K.B., Erlich, H.A., Gelfand, D.H., Horn, G., and Saiki, R.K. "Process for Amplifying Detecting, and/or Cloning Nucleic Acid Sequences Using a Thermostable Enzyme." U.S. Patent No. 4,965,188 assigned to Hoffmann-La Roche, Inc. 10/23/90.
9. Gelfand, D.H. "Stable High Copy Number Plasmids." U.S. Patent No. 4,966,840 assigned to Cetus Corp. 10/30/90.
10. Innis, M.A., Gelfand, D.H., and Meade, J.H. "DNA Expression Vector and Use Thereof." U.S. Patent No. 5,045,463 assigned to Cetus Corp. 9/3/91.
11. Innis, M.A., Myambo, K.B., Gelfand, D.H., and Brow, M.A.D. "Methods for DNA Sequencing with *Thermus aquaticus* DNA Polymerase." U.S. Patent No. 5,075,216 assigned to Hoffmann-La Roche, Inc. 12/24/91.
12. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Purified Thermostable Enzyme." U.S. Patent No. 5,079,352 assigned to Hoffmann-La Roche, Inc. 1/7/92.
13. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Selectable Fusion Protein Having Aminoglycoside Phosphotransferase Activity." U.S. Patent No. 5,116,750 assigned to Cetus Corp. 5/26/92.
14. Gelfand, D.H., Holland, P.M., Saiki, R.K., and Watson, R.M. "Homogeneous Assay System Using the Nuclease Activity of a Nucleic Acid Polymerase." U.S. Patent No. 5,210,015 assigned to Hoffmann-La Roche, Inc. 5/11/93.
15. Ben-Bassat, A., Calhoun, R.D., Fear, A.L., Gelfand, D.H., Meade, J.H., Tal, R., Wong, H. and Ben-Ziman, M. "Methods and Nucleic Acid Sequences for the Expression of the Cellulose Synthase Operon." U.S. Patent No. 5,268,274 assigned to Cetus Corp. 12/7/93.
16. Gelfand, D.H., Myers, T.W. "Reverse Transcription with Thermostable DNA Polymerase-High Temperature Reverse Transcription." U.S. Patent No. 5,310,652 assigned to Hoffmann-La Roche, Inc. 5/10/94.
17. Gelfand, D.H. "Reverse Transcription with Thermostable DNA Polymerases-High Temperature Reverse Transcription." U.S. Patent No. 5,322,770 assigned to Hoffmann-La Roche, Inc. 6/21/94.
18. Gelfand, D.H. "Purified Thermostable Enzyme." U.S. Patent No. 5,352,600 assigned to Hoffmann-La Roche, Inc. 10/4/94.

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19. Gelfand, D.H., and Lawyer, F.C. "DNA Encoding a Thermostable Nucleic Acid Polymerase Enzyme from *Thermotoga maritima*." U.S. Patent No. 5,374,553 assigned to Hoffmann-La Roche, Inc. 12/20/94.
20. Abramson, R.D., Gelfand, D.H., and Greenfield, I.L. "DNA Encoding a Mutated Thermostable Nucleic Acid Polymerase from *Thermus* Species SPS17." U.S. Patent No. 5,405,774 assigned to Hoffmann-La Roche, Inc. 4/11/95.
21. Gelfand, D.H., and Myers, T.W. "Reverse Transcription with *Thermus thermophilus* Polymerase." U.S. Patent No. 5,407,800 assigned to Hoffmann-La Roche, Inc. 4/18/95.
22. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Mutated Thermostable Nucleic Acid Polymerase Enzyme from *Thermotoga maritima*." U.S. Patent No. 5,420,029 assigned to Hoffmann-La Roche, Inc. 5/30/95.
23. Abramson, R.D., Gelfand, D.H., and Greenfield, I.L. "Mutated Thermostable Nucleic Acid Polymerase Enzyme from *Thermus* Species Z05." U.S. Patent No. 5,455,170 assigned to Hoffmann-La Roche, Inc. 10/3/95.
24. Abramson, R.D., and Gelfand, D.H. "5' to 3' Exonuclease Mutations of Thermostable DNA Polymerases." U.S. Patent No. 5,466,591 assigned to Hoffmann-La Roche, Inc. 11/14/95.
25. Gelfand, D.H., Holland, P.M., Saiki, R.K., and Watson, R.M. "Nucleic Acid Detection by the 5'-3' Exonuclease Activity of Polymerases Acting on Adjacent Hybridized Oligonucleotides." U.S. Patent No. 5,487,972 assigned to Hoffmann-La Roche, Inc. 1/30/96.
26. Gelfand, D.H., and Wang, A. "Purified Thermostable Nucleic Acid Polymerases and DNA Coding Sequences From *Pyrodictum* Species." U.S. Patent No. 5,491,086 assigned to Hoffmann-La Roche, Inc. 2/13/96.
27. Gelfand, D.H., Myers, T.W., and Sigua, C.L. "Methods for Coupled High Temperature Reverse Transcription and Polymerase Chain Reactions." U.S. Patent No. 5,561,058 assigned to Hoffmann-La Roche, Inc. 10/1/96.
28. Gelfand, D.H., and Myers, T.W. "Unconventional Nucleotide Substitution in Temperature Selective RT-PCR." U.S. Patent No. 5,618,703 assigned to Hoffmann-La Roche, Inc. 4/8/97.
29. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Recombinant Expression Vectors and Purification Methods for *Thermus thermophilus* DNA Polymerase." U.S. Patent No. 5,618,711 assigned to Hoffmann-La Roche, Inc. 4/8/97.
30. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Purified Thermostable Nucleic Acid Polymerase Enzyme from *Thermotoga maritima*." U.S. Patent No. 5,624,833 assigned to Hoffmann-La Roche, Inc. 4/29/97.
31. Gelfand, D.H. "Kits for High Temperature Reverse Transcription of RNA." U.S. Patent No. 5,641,864 assigned to Hoffmann-La Roche, Inc. 6/24/97.
32. Gelfand, D.H., and Wang, A.M. "Purified Nucleic Acid Encoding a Thermostable Pyrophosphatase." U.S. Patent No. 5,665,551 assigned to Roche Molecular Systems, Inc. 9/9/97.
33. Abramson, R.D., Gelfand, D.H., and Greenfield, I. "DNA Encoding Thermostable Nucleic Acid Polymerase Enzyme from *Thermus* species Z05." U.S. Patent No. 5,674,738 assigned to Roche Molecular Systems, Inc. 10/7/97.
34. Gelfand, D.H., Myers, T.W. and Sigua, C.L. "Reagents and Methods for Coupled High Temperature Reverse Transcription and Polymerase Chain Reactions ." U.S. Patent No. 5,693,517 assigned to Roche Molecular Systems, Inc. 12/2/97.
35. Tal, R., Gelfand, D.H., Calhoon, R.D., Ben-Bassat, A., Benziman, M., Wong, H.C. "Cyclic Diguanilate Metabolic Enzymes." U.S. Patent No. 5,759,828 assigned to Weyerhaeuser. 6/2/98.



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36. Gelfand, D.H., Lawyer, F.C., and Stoffel, S. "Recombinant Expression Vectors and Purification Methods for *Thermus thermophilus* DNA polymerase." U.S. Patent No. 5,789,224 assigned to Roche Molecular Systems, Inc. 8/4/98.
37. Abramson, R.D., and Gelfand, D.H., "5' to 3' Exonuclease Mutations of Thermostable DNA Polymerases." U.S. Patent No. 5,795,762 assigned to Roche Molecular Systems, Inc. 8/18/98.
38. Gelfand, D.H., Holland, P.M., Saiki, R.K., and Watson, R.M. "Reaction Mixtures for Detection of Target Nucleic Acids," U.S. Patent No. 5,804,375 assigned to Roche Molecular Systems, Inc. 9/8/98.
39. Gelfand, D.H., Kalman, L.V., and Reichert, F.L. "Thermostable DNA Polymerases having Reduced Discrimination against ribo-NTPs." U.S. Patent No. 5,939,292 assigned to Roche Molecular Systems, Inc. 8/17/99.
40. Gelfand, D.H., Greenfield, L.I., and Reichert, F.L. "Purified Thermostable Nucleic Acid Polymerase Enzyme from *Thermosipha africanus*," U.S. Patent No. 5,968,199 assigned to Roche Molecular Systems, Inc. 10/19/99.
41. Erlich, H.A., Horn, G., Saiki, R., Mullis, K., and Gelfand, D.H. "Kits for Amplifying and Detecting Nucleic Acid Sequences, Including a Probe." U.S. Patent No. 6,040,166 assigned to Roche Molecular Systems, Inc. 3/21/00.
42. Gelfand, D.H., Stoffel, S. and Saiki, R.K. "Stabilized Thermostable Nucleic Acid Polymerase Compositions Containing Non-Ionic Polymeric Detergents." U.S. Patent No. 6,127,155 assigned to Roche Molecular Systems, Inc. 10/3/00.
43. Erlich, H.A., Horn, G., Saiki, R.K., Mullis, K.B. and Gelfand, D.H. "Kits for Amplifying and Detecting Nucleic Acid Sequences." U.S. Patent No. 6,197,563 assigned to Roche Molecular Systems, Inc. 3/6/01.
44. Gelfand, D.H., Holland, P.M., Saiki, R.K. and Watson, R.M. "Homogeneous Assay System." U.S. Patent No. 6,214,979 B1 assigned to Roche Molecular Systems, Inc. 4/10/01.
45. Gelfand, D.H. and Reichert, F.L. "Mutant Chimeric DNA Polymerase." U.S. Patent No. 6,228,628 B1 assigned to Roche Molecular Systems, Inc. 5/8/01.
46. Gelfand, D.H., Kalman, L.V., Reichert, F.L., Sigua, C.L. and Myers, T.W. "Thermostable DNA Polymerases Incorporating Nucleoside Triphosphates Labeled with Fluorescein Family Dyes." U.S. Patent No. 6,346,379 assigned to F. Hoffman-La Roche AG. 2/12/02.
47. Erlich, H.A., Horn, G., Saiki, R.K., Mullis, K.B. and Gelfand, D.H. "Kits for Amplifying and Detecting Nucleic Acid Sequences." U.S. Patent No. 6,514,736 B1 assigned to Roche Molecular Systems, Inc. 2/04/03.